



Attorney's Docket No. 032745-020 *AF / \$*

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

Werner Groh et al.

Application No.: 09/619,535

Filed: July 19, 2000

For: NON-WOVEN LAMINATE  
COMPOSITE

) **MAIL STOP APPEAL BRIEF -**  
) **PATENTS**

) Group Art Unit: 1771

) Examiner: Lynda Salvatore

) Appeal No.: N/A  
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**APPEAL BRIEF**

**Mail Stop APPEAL BRIEF - PATENTS**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

This appeal is from the decision of the Primary Examiner dated January 25, 2005 (Paper No. N/A, finally rejecting claims 1-10, 12-15, 17 and 18, which are reproduced as the Claims Appendix of this brief.

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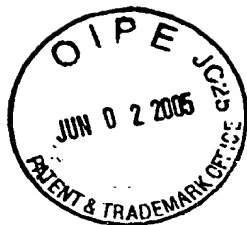
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I. Real Party in Interest

The present application is assigned to JOHNS MANVILLE INTERNATIONAL, who is the real party in interest, and is the assignee of Application No. 09/619,535.

II. Related Appeals and Interferences

The Appellants' legal representative, or assignee, does not know of any other appeal or interferences which will affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1-10, 12-15, 17 and 18 stand finally rejected. Claims 19-21 and 23-39 stand withdrawn from consideration on the merits as not readable on the elected invention. Claims 40-43 have been allowed. Claims 11, 16 and 22 have been canceled.

IV. Status of Amendments

The Request for Reconsideration pursuant to 37 C.F.R. §1.116, filed January 3, 2005, has been entered according to the Advisory Action mailed January 25, 2005.

V. Summary of Claimed Subject Matter

Claim 1, the broadest claim on appeal, is directed to a laminate that is not subjected to final consolidation by a binder, i.e. the laminate after being prepared by needling the layers together, is not impregnated with a resinous binder and subjected to curing conditions. The laminate comprises (1) at least one layer of a non-woven mat containing glass staple fibers which have been pre-consolidated with a resin, and (2) at least one non-woven layer of synthetic fibers, the synthetic fibers having been heat-shrunk. The non-woven layers are bound together by needling

such that a portion of the synthetic fibers present in the synthetic non-woven layer pass completely through the glass fiber layer and penetrate a side of the glass fiber layer facing away from the synthetic layer. If the laminate includes another underlying synthetic fiber layer, then a part of the synthetic fibers also penetrate through the underlying layer.

As explained in the specification, needling is performed such that at least a portion of the synthetic fibers penetrate the surface of the glass fiber layer and may even cling to that surface; see page 12, lines 20-23 and page 15, lines 9-11. This feature is important to the unique properties of the laminate since the protruding fibers act as anchors for subsequent bitumen or resin impregnation when the laminate is used as reinforcement in manufacturing roofing felts, sealing membranes and floor coverings. This needling feature enables one to interlock the layers of the laminate together and improve the bonding therebetween without the necessity of employing binders for a final consolidation.

A surprising and important advantage of the present invention is the fact that the use of resinous binders for final consolidation can be eliminated without adversely affecting the properties of the laminates. The elimination of final consolidation binders provides economic advantages (the cost of binders), environmental advantages (avoid using organic solvents with binders), and unexpectedly yields products of improved strengths. In this connection, attention is directed to the data on page 20 of the specification. A laminate prepared according to the invention without using a binder for final consolidation was bituminized and compared to a similar bituminized laminate manufactured with end consolidation using a binder. The comparative data shows that the laminates prepared in accordance with the invention unexpectedly provided bituminized products having significantly higher tensile strength.

#### VI. Grounds of Rejection to be Reviewed on Appeal

Claims 1, 3-10, 14, 15, 17 and 18 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent No. 5,616,395 to Bavarian et al.

(hereinafter Baravian et al. '395) in view of Reissue Patent No. 33,023 to Hiers (hereinafter Hiers '023).

Claims 2, 12 and 13 stand finally rejected under 35 U.S.C. §103(a) as unpatentable over Baravian et al. '395 in view of Hiers '023 and further in view of U.S. Patent No. 5,171,629 to Heidel et al. (hereinafter Heidel et al. '629).

## VII. Argument

Baravian et al. '395 relates to the preparation of a two-layered laminate containing a non-woven synthetic fiber layer and a scrim, grid or cloth composed of mineral fibers which may comprise discontinuous glass fibers. The two layers are bonded together by an adhesive and when the mineral fiber layer is a grid or cloth, needling or stitch-knitting may also be employed (column 2, lines 40-54; column 6, line 62 to column 7, line 4). Thus, adhesive bonding is required; needling or knit-stitching is also employed when a grid or cloth is employed. No specific needling conditions are disclosed to bond the layers. According to Baravian et al. '395, their technique enables one to eliminate the use of two outer synthetic fiber layers which otherwise would isolate the mineral fiber layer and adversely affect fire retardant properties (column 1, line 65 to column 2, line 21).

Thus, the laminates disclosed in Baravian et al. '395 differ from those claimed in present claim 1 in at least two aspects: (1) the reference does not disclose needling the layers such that a portion of the synthetic fibers pass entirely through the glass fiber layer and penetrate the surface thereof; and (2) the glass fiber layer in the reference is not disclosed as being pre-consolidated with a resin.

Moreover, the laminates of Baravian et al. '395 consist of two layers whereas the laminates of appealed claims 3, 7 and 8 are composed of at least two non-woven layers of synthetic fibers surrounding the non-woven glass fiber layer.

Hiers '023 discloses a composite fabric composed of at least one organic fiber layer needled to a glass fiber layer. Needling is conducted such that some of the organic fibers pass through the glass fiber layer to bind the layers together. As can be seen from Figures 1 and 2 of this reference, the organic fibers do not penetrate the surface of the glass fiber layer opposite the organic fiber layer.

Since Baravian et al. '395 fails to mention any needling technique, there is no disclosure therein that would have provided motivation to use the needling system of Hiers '023 as opposed to any other needling operations available in the prior art, particularly since the fabrics of Hiers '023 are not intended to be used as reinforcement in bituminous roofing products as are the products of Baravian et al. '395.

It appears to be the Examiner's position that the needling technique described in Hiers '023 would inherently penetrate through the surface of the glass fiber layer. There is clearly no support for this position in the reference. The present claims positively specify that a portion of the synthetic fibers penetrate beyond a surface of the glass fiber layer. This provides anchoring sites for subsequently-applied layers such as bitumen and enables Applicants to eliminate the use of final-consolidation binders without adversely affecting the properties of the laminate.

With respect to the rejection of claims 3, 7 and 8 which are directed to laminates of at least three layers, the Examiner contends that it would have been obvious to modify the two-layered laminates of Baravian et al. '395 to include an additional layer in view of Hiers '023. Appellants disagree and note that Baravian et al. '395 expressly teaches away from sandwiching the glass fiber layer between organic fiber layers; note column 2, lines 9-15 ("which arrangement is exactly to be avoided"). If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no motivation to make the proposed modification (M.P.E.P. §2143.01, pg. 2100-126, Feb. 2003). Quite clearly, adding an additional synthetic fiber layer to the laminate of Baravian et al. '395 would isolate the glass fiber fire-retardant layer. This is exactly the arrangement which the reference states is to be avoided.

Turning to the rejection of claims 2, 12 and 13, Heidel et al. '629 has been added to the basic rejection to provide motivation for pre-consolidating the glass fiber layer with melamine resins or polymeric binders. There is no explicit disclosure in Baravian et al. '395 of pre-consolidating the glass fiber layer with melamine resins or polymeric binders. There is no disclosure in the cited references which would provide a motivation to use the pre-consolidated resin binders disclosed in Heidel et

al. '629 as opposed to any other binders known in the art. This is particularly true because the laminates of Heidel et al. '629 require final consolidation as opposed to the laminates of Baravian et al. '395.

In summary, Baravian et al. '395 does not disclose any details of how needling is to be accomplished. The needling operation disclosed in Hiers '023 does not result in a portion of the organic fibers penetrating beyond the surface of the glass fiber layer. This feature as set forth in the present claims provides unexpected benefits, i.e. the fibers which penetrate beyond the surface act as anchoring sites for further impregnation of bitumen or other coatings thereby eliminating the need for final binder-consolidation without adversely affecting the stability, fire-retardance, strength and other physical attributes of the product.

For at least the aforementioned reasons, Appellants respectfully submit that the final rejection of claims 1-10, 12-15, 17 and 18 is unsound and should be reversed.

#### VIII. Claims Appendix

See attached Claims Appendix for a copy of the claims involved in the appeal.

IX. Evidence Appendix

See attached Evidence Appendix for copies of evidence relied upon by Appellant.

X. Related Proceedings Appendix

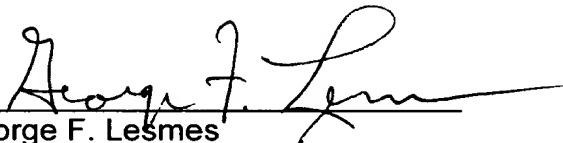
See attached Related Proceedings Appendix for copies of decisions identified in Section II, supra.

Respectfully submitted,

Burns, Doane, Swecker & Mathis, L.L.P.

Date June 2, 2005

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## **VIII. CLAIMS APPENDIX**

### **The Appealed Claims**

Claim 1. A laminate that is not subjected to final consolidation by a binder, comprising:

at least one non-woven mat containing glass staple fibers pre-consolidated with a resin, and at least one non-woven layer of synthetic fibers, wherein the at least one synthetic non-woven layer and the pre-consolidated non-woven mat containing glass fibers are bounded together by needling such that a portion of the fibers of the synthetic non-woven layer passes through the non-woven layer containing glass fibers and penetrates a side of the layer of glass fibers facing away from the layer of synthetic fibers, and optionally through any underlying synthetic non-woven layer, and wherein the synthetic fibers are heat shrunk and the laminate is binder free.

Claim 2. The laminate according to Claim 1, wherein said pre-consolidation resin is selected from the group consisting of urea, acrylate, melamine, phenolic, epoxy, vinyl acetate, polyvinyl alcohol and polyvinyl chloride resins.

Claim 3: The laminate according to Claim 1, wherein at least two non-woven layers of heat shrunk synthetic fibers are present and the gsm substance (basis weight) of said layers of synthetic non-woven layers is equal or different

Claim 4: The laminate according to Claim 1, wherein the synthetic fibers are selected from the group consisting of polyester, poly(ethylene terephthalate) and polypropylene.

Claim 5: The laminate according to Claim 1, wherein the synthetic non-wovens fibers are filamentary.

Claim 6: The laminate according to Claim 1, wherein the synthetic non-wovens fibers are staple fibers.

Claim 7: The laminate according to Claim 1, wherein the laminate comprises two filamentary synthetic non-wovens layers and a non-woven containing glass fibers in a sandwich-structure where the ratio of the gsm substance of the two filamentary synthetic non-wovens is 1:1 to 1:5.

Claim 8: The laminate according to Claim 7, wherein the ratio of the gsm substance of said two filamentary non-wovens is about 1:1 to 1:2.

Claim 9: The laminate according to Claim 1, wherein the synthetic non-wovens are mechanically, thermally or hydrodynamically pre-consolidated.

Claim 10: The laminate according to Claim 1, wherein the synthetic non-wovens are not consolidated prior to needling.

Claim 12: The laminate according to Claim 1, wherein the non-woven of glass fibers contains 5 to 45% by weight of a binder resin.

Claim 13: The laminate according to Claim 1, wherein the non-woven of glass containing fibers contains 10 to 30% by weight of a binder resin.

Claim 14: The laminate according to Claim 1, wherein the laminate is produced at a minor draft in the needle machine.

Claim 15: The laminate according to Claim 14, wherein the needle draft is from about 0 to 13 mm/stroke.

Claim 17: The laminate according to Claim 1, wherein the non-woven containing glass fibers contains glass fibers of the E class, C class, mixtures thereof and ECR glass.

Claim 18: The laminate according to Claim 1, wherein said synthetic non-woven layer includes filamentary polyesters.

Claim 19: A method for the production of the laminate according to claim 1, which comprises pre-consolidating at least one non-woven mat containing glass staple fibers with a resin, disposing said layer beneath a non-woven layer of synthetic fibers or between non-woven layers of synthetic fibers, wherein the non-woven layers of synthetic fibers and the pre-consolidated non-woven mat containing glass fibers are bound together by needling such that a part of the fibers of the synthetic non-woven passes through the non-woven mat containing glass fibers, heat shrinking the synthetic fibers and forming said laminate without final consolidation through the use of a binder.

Claim 20: The method Claim 19, wherein said pre-consolidation resin is selected from the group consisting of urea, acrylate and melamine, phenolic, epoxy, vinyl acetate, polyvinyl alcohol and polyvinyl chloride resins.

Claim 21: The method of Claim 19, wherein said non-woven layers of synthetic fibers are of equal or different thicknesses.

Claim 23: The method Claim 19, wherein a part of the synthetic fibers of said synthetic layer penetrate said non-woven layer containing glass fibers and an underlying synthetic layer.

Claim 24: The method of Claim 19, wherein the synthetic fibers in the non-woven layer are shrunken prior to bonding with the non-woven layer containing glass fibers.

Claim 25: The method of Claim 19, wherein said synthetic fibers are selected from the group consisting of polyester, poly(ethylene terephthalate) and polypropylene.

Claim 26: The method of Claim 19, wherein said synthetic non-wovens fibers are filamentary.

Claim 27: The method of Claim 19, wherein the synthetic non-wovens fibers are staple fibers.

Claim 28: The method of Claim 19, further comprising needling of said non-woven mat containing glass staple fibers and the non-woven layers of synthetic fibers with needles that have a distance between the needle point and the first barb of about 2 to 4 mm.

Claim 29: The method of Claim 19, wherein said needling is executed with a forward feed ratio for the stroke of less than 14 mm/stroke.

Claim 30: The method of Claim 19, wherein said non-woven mat of glass staple fibers is reinforced with longitudinal fibers, yarns or scrims.

Claim 31: The method of Claim 19, wherein the fibers of said synthetic non-woven are shrunken at temperatures of 140 to 220°C.

Claim 32: The method of Claim 19, further comprising:  
compressing the laminate with a calender.

Claim 33: The method of Claim 32, wherein said calender is fabric/belt or laminate calender.

Claim 34: The method of Claim 19, further comprising shrinking said laminate at temperatures that corresponds at least to the temperature of a bitumen containing bath used for bituminizing the laminate.

Claim 35: The method of Claim 34, wherein said shrinking temperature is up to 30°C above the temperature of the bitumen bath.

Claim 36: The method of Claim 19, wherein said non-wovens layer containing glass fibers includes fibers of the E or C class, mixtures thereof and ECR glass.

Claim 37: Bituminized roofing felts or sealing membranes containing the laminate of Claim 1 as support.

**Claim 38:** Bitumen shingles containing the laminate of Claim 1 as support.

**Claim 39:** Floor covering containing the laminate of Claim 1 as support.

**Claim 40:** The laminate according to Claim 42, wherein reinforcements are fibers, yarns running in lengthwise direction or scrims.

**Claim 41:** The laminate according to Claim 40, wherein the reinforcements are disposed within or between the layers of the laminate.

**Claim 42:** A laminate that is not subjected to final consolidation by a binder, comprising:

at least one non-woven mat containing glass staple fibers pre-consolidated with a resin, and at least one non-woven layer of synthetic fibers, wherein the at least one synthetic non-woven layer and the pre-consolidated non-woven mat containing glass fibers are bound together by needling such that a portion of the fibers of the synthetic non-woven layer passes through the non-woven layer containing glass fibers and penetrates a side of the layer of glass fibers facing away from the layer of synthetic fibers, and optionally through any underlying synthetic non-woven layer, and wherein the synthetic fibers are heat shrunk and the laminate includes reinforcement and is binder free.



## EVIDENCE APPENDIX

NONE



## **X. RELATED PROCEEDINGS APPENDIX**

**NONE**